

SRB CRITICAL ITEMS LIST

SUBSYSTEM: THRUST VECTOR CONTROL

ITEM NAME: Single Mission Fuel Isolation Valve (SMFIV)

PART NO.: 10201-0122-801 FM CODE: A09
(Alt. for BI109 and BI110,
Mandatory for BI 111 and Subs)

ITEM CODE: 20-01-10A REVISION: Basic

CRITICALITY CATEGORY: 1R REACTION TIME: Seconds

NO. REQUIRED: 2 DATE: April 1, 2001

CRITICAL PHASES: Boost SUPERCEDES:

FMEA PAGE NO.: A-20N ANALYST: G.Hoskins/S. Finnegan

SHEET 1 OF 3 APPROVED: S. Parvathaneni

FAILURE MODE AND CAUSES: Insufficient fuel flow due to obstruction of flow passage (System A and B) caused by :

- o Filter clogged
- o Filter collapsed
- o Contamination
- o Obstruction of flow passage

FAILURE EFFECT SUMMARY: Failure of valve to allow sufficient fuel flow during boost will result in loss of TVC which leads to vehicle break up and loss of mission, vehicle and crew.

REDUNDANCY SCREENS AND MEASUREMENTS:

- 1) Pass - ATP-MR A-9480 at vendor's plant and per 10SPC-0240.
- 2) Pass - APU turbine speed B46R1406C, B46R1407C, B46R1408C, and B46R1409C ; Hydraulic Pressure Measurement B58P1303C and B58P1304C
- 3) Fail - Contamination

RATIONALE FOR RETENTION:

A. DESIGN

- o The Single Mission Fuel Isolation Valve is designed and qualified in accordance with end item specification 10SPC-0240. (All failure causes)
- o Qualification testing verified design requirements as reported in Moog Inc. Qualification Test Report MR T-10241. (All failure causes)
- o Filter is CRES 303 and CRES 304L. (Filter collapse)
- o Material selections are per MSFC-SPEC-522A. (All failure causes)
- o Operational and test fluids meet purity and particulate requirements of SE-S-0073. (All failure causes)
- o TVC system includes 25 micron (absolute) filter upstream of Single Mission Fuel Isolation Valve. (Contamination)

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B. TESTING

- o Acceptance testing is performed per Moog Inc.'s ATP MR A-9480 on each flight article at the vendor's plant. This includes Visual Examination, Electrical Tests, Performance Checks (including flow Δ P Test), and Cleanliness Verification. (All failure causes)
- o Nitrogen is verified for cleanliness and composition (purity and particulate count) prior to introduction to on board flight hardware per 10REQ-0021 Para 2.3.2.2 and OMRSD File V Vol 1, Requirement Number B42APO.012. (All failure causes)
- o Hydrazine is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board flight hardware per 10REQ-0021, para. 2.3.2.1 and OMRSD File V, Vol. 1, Requirement Number B42APO.010. (All failure causes)
- o Helium is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board flight hardware per 10REQ- 0021, para. 2.3.2.5. (All failure causes)
- o Electrical and functional tests are performed per 10REQ-0021, para. 2.3.4.3 and 2.3.15.2. (All failure causes)
- o TVC system functional test is performed during Hot Fire operations per 10REQ-0021, para. 2.3.16. (All failure causes)

The above referenced OMRSD testing is performed every flight.

C. INSPECTION

I. VENDOR RELATED INSPECTION

- o Verification that material certifications meet the requirements called for on drawings and USA-SRB Element Purchase Order by USA SRBE PQAR per SIP 1511. (All failure causes)
- o Verification that all sealing surfaces have been inspected and accepted by Moog for dimensional and surface finish requirements and no damage to surface by USA SRBE PQAR per SIP 1511. (All failure causes)
- o All surfaces exposed to Hydrazine media, and require cleanliness verification, have been inspected and accepted by Moog and verified by USA SRBE PQAR per SIP 1511. (Contamination)
- o Witness acceptance testing in which measurements and/or readings are manually taken and/or recorded for the first two units in each test lot of FIV by USA SRBE PQAR per SIP 1511. Monitor acceptance testing for all other units in each test lot. (All failure causes).
- o Perform post-ATP final inspection of unit (Ref. ATP MR-9480) by USA SRBE PQAR per SIP 1511. (All failure causes)
- o CRITICAL PROCESSES/INSPECTIONS:
 - None recommended

II. KSC RELATED REFURBISHMENT INSPECTIONS

- o N/A

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III. KSC RELATED ASSEMBLY AND OPERATIONS INSPECTIONS

- o Proper function of TVC system is demonstrated during hotfire per 10REQ- 0021, para. 2.3.16. (All failure causes).
- o Helium cleanliness and composition (purity and particulate count) are verified prior to introduction to on board flight hardware per 10REQ- 0021, para. 2.3.2.5. (All failure causes)
- o Nitrogen is verified for cleanliness and composition (purity and particulate count) prior to introduction to on board flight hardware per 10REQ-0021 Para 2.3.2.2 and OMRSD File V Vol 1, Requirement Number B42APO.012. (All failure causes)
- o Hydrazine cleanliness and composition (purity and particulate count) are verified prior to introduction to on board flight hardware per 10REQ- 0021, para. 2.3.2.1 and OMRSD File V, Vol. 1, Requirement Number B42APO.010. (All failure causes)
- o Verification of proper valve operation during BITE per OMRSD File V, Vol. 1, Requirement Number B42AP0.050. (All failure causes)
- o Verification of proper APU start condition per File II, Vol. 1, Requirement Number SOOFRO.070 (All failure causes)

D. FAILURE HISTORY

- o Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- o Not applicable.

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